



COPY

January 15, 2019

Reference No. 075398

Mr. Gary Guillory  
City of Sedalia  
Water Pollution Control Program  
200 South Osage  
Sedalia, MO 65301

Dear Mr. Guillory:

**Re: 2018 Second Semi-Annual Discharge Report  
UPRR Sedalia, MO – Former MP Shops**

On behalf of Union Pacific Railroad (UPRR), GHD Services Inc. (GHD) has prepared this semi-annual report regarding the water discharge from the Groundwater Recovery System (RS-1 System), located at the UPRR Sedalia Former MP Shops facility in Sedalia, Missouri.

The information presented in this document has been assembled in accordance with the discharge application letter dated February 28, 1995, and the City of Sedalia's response dated March 23, 1995. Analytical results are compared to the City of Sedalia's discharge limit of 2.13 milligrams per liter (mg/L) for Total Toxic Organics (TTO).

In accordance with the March 19, 2009, letter from the City of Sedalia, semi-annual monitoring of the trench began on June 4, 2009, and has continued every June and December thereafter. UPRR reports the analytical results and cumulative volume of discharged water to the City of Sedalia Public Works Director on a semi-annual basis.

Table 1 summarizes the December 11, 2018, sampling results. All analytical results are displayed in mg/L.

**Table 1. Discharge Sampling Results from December 11, 2018.**

Date	cis-1,2,- Dichloroethene (cis-1,2-DCE) (mg/L)	trans-1,2- Dichloroethene (trans-1,2- DCE) (mg/L)	Tetrachloroethene (PCE) (mg/L)	Trichloroethene (TCE) (mg/L)	Vinyl Chloride (VC) (mg/L)	Total Toxic Organics (TTO) (mg/L)
12/11/18	0.0142	0.00216	0.0223	0.013	0.00138	0.0530
ND = not detected						

RCRA 1/15/2019



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Table 2 provides the average discharge flow rate and cumulative-volume of water discharged from June 2018 – December 2018 by the RS-1 system.

**Table 2 Discharge Flowrate and Volume from June 2018 – December 2018**

Average Discharge Flow Rate (6/27/2018 – 12/11/2018) (gpm)	Cumulative Volume (6/27/2018 – 12/11/2018) (gallons)
0.03	7,642

Volatile organic compound (VOC) detections for the December 2018 sampling event were summed to determine the TTO discharge, as shown in Table 1. The TTO concentration is well below the City of Sedalia's discharge limit of 2.13 mg/L.

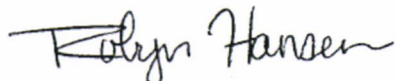
The analytical data provided by TestAmerica Laboratory was reviewed to assess data quality in terms of precision and accuracy. Results from trip blanks, laboratory blanks, method calibrations, surrogate recoveries, and control sample analyses were reviewed by GHD. Sample holding times and preservation were also assessed. All data quality elements were satisfied.

Historical analytical results and meter readings are attached in Table 3. The laboratory analytical report, chain-of-custody form, and data validation memo for the December 2018 sampling event are also attached.

If you have any questions, please contact me at (402) 778-4801 or [robyn.hansen@ghd.com](mailto:robyn.hansen@ghd.com).

Sincerely,

GHD



Robyn Hansen

RH/rm/5

Encl.

Table 3: Cumulative Flow and Analytical Results

Attachment 1: Analytical Report

Attachment 2: Data Validation Report

cc: Laura Pollack, Union Pacific Railroad  
Robert Aston, U.S. EPA (1 copy; RCRA Docket No. VII-90-H-0024)  
Jalal El-Jayyousi, MDNR (2 copies)

**Table 3**  
**Cumulative Flow & Analytical Results**



**TABLE 3**  
**Historical Discharge and Statistical Summary**  
**Former MP Shops**  
**Sedalia, Missouri**

	<i>Cumulative Volume</i>	<i>Average Flow Rate</i>	<i>cis-1,2- Dichloroethene (cis- 1,2-DCE)</i>	<i>trans-1,2- Dichloroethene (trans-1,2-DCE)</i>	<i>Tetrachloroethene (PCE)</i>	<i>Trichloroethene (TCE)</i>	<i>Vinyl Chloride (VC)</i>	<i>Total Toxic Organics (TTO)</i>	<i>Period Discharge</i>
<i>Sample Date</i>	<i>Gallons</i>	<i>GPM</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>Gallons</i>
06/28/1995	0	-			System started at 2:00 p.m.				
06/29/1995	5,371	3.7	0.01700	0.00320	0.03400	0.01700	ND	0.1300	
07/18/1995	73,000	2.5	0.01400	0.01100	0.04000	0.03300	0.01300	0.1110	
09/28/1995	253,318	1.7	0.06700	0.01200	0.11000	0.05400	0.01500	0.2600	
12/19/1995	439,419	1.6	0.11000	0.02200	0.12000	0.06500	0.01000	0.3270	
02/13/1996	-	-	0.07300	0.01500	0.11000	0.05800	0.00210	0.2581	
04/25/1996	656,818	1.2	0.05000	0.01200	0.06400	0.03200	0.01100	0.1690	
08/28/1996	1,059,777	2.2	-	0.00700	0.06200	0.04900	0.00450	0.1225	
10/16/1996	1,173,961	1.6	0.06000	0.01000	0.13000	0.06500	0.00290	0.2679	
04/01/1997	1,864,960	2.9	0.04100	0.00880	0.06900	0.03500	0.00100	0.1548	
05/02/1997	2,052,599	4.2	0.03300	0.00690	0.04500	0.02900	ND	0.1139	
08/19/1997	2,321,764	1.7	0.01400	0.00470	0.03200	0.01900	0.00360	0.0733	
10/08/1997	2,458,454	1.9	0.04000	0.00640	0.06900	0.01800	ND	0.1334	
03/30/1998	2,976,273	2.1	0.02300	0.00520	0.04900	0.02500	0.00140	0.1036	
06/29/1998	3,386,071	3.1	0.01850	0.00400	0.02430	0.01950	ND	0.0663	
09/25/1998	3,835,186	3.5	0.01730	0.00400	0.02690	ND	ND	0.0482	
01/18/1999	4,249,989	2.5	0.01670	0.00470	0.02500	0.01640	ND	0.0628	
04/06/1999	4,880,439	5.6	0.02440	0.00490	0.03420	0.02430	ND	0.0878	
06/24/1999	5,350,498	4.1	0.02260	0.00445	0.03380	0.02110	ND	0.0820	
09/28/1999	5,503,302	1.1	0.02140	ND	0.01780	0.01630	0.01020	0.0657	
12/09/1999	5,564,053	0.6	0.02710	0.006470	0.02030	0.01300	ND	0.0669	
04/12/2000	5,866,035	1.7	0.03400	0.006000	0.05400	0.03100	ND	0.1250	
07/21/2000	6,047,025	1.3	0.01700	0.003000	0.02900	0.01400	0.00210	0.0651	
09/26/2000	6,174,103	1.3	0.01400	ND	0.02760	0.01380	ND	0.0554	
12/28/2000	-	-	-	-	-	-	-	-	
03/19/2001	-	0	0.00590	0.00120	0.01400	0.00630	ND	0.0274	
06/06/2001	-	0	0.00180	ND	0.00660	0.00021	ND	0.0086	
09/24/2001	6,176,634	0	0.01700	0.00330	0.03100	0.01500	0.00240	0.0687	
12/03/2001	6,192,107	0.2	0.01180	0.00280	0.03290	0.01370	ND	0.0612	
03/13/2002	6,228,838	0.3	0.01320	0.00270	0.02800	0.01310	ND	0.0570	
06/11/2002	6,301,708	0.6	0.01360	0.00190	0.02240	0.01110	0.00150	0.0505	
10/03/2002	6,321,535	0.1	0.01320	0.00280	0.03380	0.01720	ND	0.0670	
12/02/2002	6,329,756	0.1	0.02020	0.00400	0.04340	0.02050	0.00180	0.0899	
03/20/2003	6,360,787	0.2	0.01020	0.00220	0.01820	0.01310	ND	0.0437	

"-" = Information not applicable or not available.  
ND = not detected



**TABLE 3**  
**Historical Discharge and Statistical Summary**  
**Former MP Shops**  
**Sedalia, Missouri**

	<i>Cumulative Volume</i>	<i>Average Flow Rate</i>	<i>cis-1,2- Dichloroethene (cis- 1,2-DCE)</i>	<i>trans-1,2- Dichloroethene (trans-1,2-DCE)</i>	<i>Tetrachloroethene (PCE)</i>	<i>Trichloroethene (TCE)</i>	<i>Vinyl Chloride (VC)</i>	<i>Total Toxic Organics (TTO)</i>	<i>Period Discharge</i>
<i>Sample Date</i>	<i>Gallons</i>	<i>GPM</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>Gallons</i>
06/02/2003	6,406,209	0.2	0.00172	ND	0.00524	0.00291	ND	0.0099	
09/24/2003	6,514,341	0.7	0.00738	0.001160	0.01200	0.01120	ND	0.0317	
12/14/2003	6,557,765	0.4	0.00469	ND	0.00491	0.00498	ND	0.0146	
03/31/2004	6,557,770	0	-	-	-	-	-	-	5
06/07/2004	6,564,680	0.1	0.01300	0.00240	0.03360	0.01420	ND	0.0632	6,910
01/10/2005	6,597,100	0.1	-	-	-	-	-	-	32,420
04/04/2005	6,618,095	0.2	0.00998	0.00154	0.01730	0.00832	0.00287	0.0371	20,995
06/15/2005	6,627,592	0.1	0.01580	0.00265	0.02410	0.01370	ND	0.0563	9,497
06/28/2005	6,630,725	0.2	-	-	-	-	-	-	3,133
08/25/2005	6,636,549	0.1	0.00944	0.001840	0.032400	0.01320	ND	0.0569	5,824
12/14/2005	6,657,970	0.1	0.01750	0.002880	0.033500	0.02030	ND	0.0742	21,421
04/04/2006	6,674,418	0.1	0.01540	0.002750	0.031900	0.01670	ND	0.0668	16,448
06/12/2006	6,684,232	0.1	0.01950	0.003370	0.033800	0.01910	ND	0.0758	9,814
09/18/2006	6,688,419	0	0.01340	0.002580	0.033600	0.01740	ND	0.0670	4,187
12/14/2006	6,694,830	0.1	0.00834	0.001810	0.021600	0.00970	ND	0.0415	6,411
03/06/2007	6,705,780	0.1	0.01510	0.002220	0.026100	0.01320	ND	0.0566	10,950
07/06/2007	6,730,522	0.1	0.00961	0.001850	0.021700	0.01150	ND	0.0447	24,742
09/27/2007	6,733,698	0.03	0.01650	0.003670	0.033900	0.01740	ND	0.0715	3,176
12/06/2007	6,735,910	0.02	0.02360	0.004100	0.050100	ND	ND	0.0778	2,212
03/13/2008	6,747,390	0.08	0.01680	0.002760	0.027000	0.01520	ND	0.0618	11,480
06/20/2008	6,793,187	0.32	0.00174	ND	0.008220	0.00329	ND	0.0133	48,797
09/11/2008	6,804,478	0.09	0.01220	0.002040	0.023000	0.01220	ND	0.0474	11,291
12/18/2008	6,823,822	0.14	0.00661	ND	0.013700	0.00651	ND	0.0268	19,344
02/26/2009	6,838,863	0.15	0.01170	0.001850	0.019000	0.01080	ND	0.0434	15,041
06/04/2009	6,893,748	0.39	0.00777	0.001260	0.011200	0.00684	ND	0.0271	54,885
12/29/2009	6,933,824	0.13	0.00249	ND	0.004040	0.00179	ND	0.0083	40,076

"-" = Information not applicable or not available.  
ND = not detected

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**Historical Discharge and Statistical Summary**  
**Former MP Shops**  
**Sedalia, Missouri**

	<i>Cumulative Volume</i>	<i>Average Flow Rate</i>	<i>cis-1,2- Dichloroethene (cis- 1,2-DCE)</i>	<i>trans-1,2- Dichloroethene (trans-1,2-DCE)</i>	<i>Tetrachloroethene (PCE)</i>	<i>Trichloroethene (TCE)</i>	<i>Vinyl Chloride (VC)</i>	<i>Total Toxic Organics (TTO)</i>	<i>Period Discharge</i>
<i>Sample Date</i>	<i>Gallons</i>	<i>GPM</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>mg/L</i>	<i>Gallons</i>
06/03/2010	7,033,718	0.44	0.00959	0.00190	0.017000	0.00842	ND	0.0369	99,894
12/15/2010	7,064,515	0.11	0.00945	0.00128	0.017100	0.00908	ND	0.0369	30,797
06/06/2011	7,145,481	0.33	0.00881	0.00160	0.018600	0.00912	ND	0.0381	80,966
12/21/2011	7,157,336	0.04	0.00482	ND	0.004150	0.00308	ND	0.0121	11,855
06/14/2012	7,209,808	0.21	0.0237	0.00274	0.0272	0.0143	0.00907	0.0770	52,472
12/05/2012	7,216,259	0.03	0.0174	0.00221	0.0330	0.0158	ND	0.0684	6,451
06/10/2013	7,273,775	0.21	0.00441	ND	0.00863	0.00379	ND	0.0168	57,516
12/18/2013	7,284,944	0.04	0.00990	0.00148	0.0202	0.0110	ND	0.0426	11,169
06/18/2014	7,303,757	0.07	0.01590	0.00227	0.0220	0.0115	0.0035	0.0552	18,813
12/15/2014	7,321,634	0.07	0.01120	0.00140	0.0159	0.00861	ND	0.0371	17,877
06/23/2015	7,363,281	0.15	0.00749	0.00152	0.0163	0.00874	ND	0.0341	41,647
12/07/2015	7,387,909	0.10	0.00928	0.00117	0.0150	0.00793	ND	0.0334	24,628
06/27/2016	7,437,551	0.17	0.0118	0.00202	0.0225	0.0129	ND	0.0492	49,642
12/27/2016	7,458,677	0.08	0.0084	0.00146	0.0191	0.0105	ND	0.0395	21,126
06/13/2017	7,492,904	0.14	0.0105	0.00202	0.0214	0.0118	ND	0.0457	34,227
12/20/2017	7,506,969	0.05	0.0135	0.00142	0.0266	0.0149	ND	0.0564	14,065
06/27/2018	7,532,684	0.09	0.0129	0.00241	0.0307	0.0189	0.00324	0.0682	25,715
12/11/2018	7,540,326	0.03	0.0142	0.00216	0.0223	0.0130	0.00138	0.0530	7,642

Notes:

1. On June 23, 2015, the pump and alarm notification system were found to not be properly working. The pump was repaired on June 24, 2015.
2. The recovery trench line was damaged around August 5, 2013 and repaired on April 25, 2014.
3. On December 7, 2009, it was discovered that the RS-1 system was not operating. A faulty surge suppressor was replaced and the system was restarted on December 21, 2009.
4. On June 21, 2006, a power outage occurred shutting off power to the pump. Power was restored on July 6, 2006.
5. On January 18, 2005, the RS-1 System was found vandalized. On March 22, 2005, system was back online with exception to flow meter.
6. On April 22, 2005, the RS-1 System was fully functional.
7. Extensive overhaul of pump and other parts performed during Q1 2004. Trench was restarted on March 31, 2004.
8. On December 14, 2003, the RS-1 System was saturated, pump was off and alarm system found vandalized.
9. On November 13, 2001, a power outage occurred shutting off power to the pump. Power was restored on Nov. 23, 2001.
10. The Accu-Flow meter was recalibrated for a 1-inch pipe on July 24, 2001.
11. The battery in the Accu-Flow meter was replaced and the meter reset to factory settings on April 30, 2001.
12. The LED display in the control panel was not operating during the March 19, 2001 quarterly sampling event; therefore, Total Flow Volume and Flow Rate could not be read.
13. During the December 28, 2000, event, samples were not collected and the control panel was not operating due to extremely cold weather.

"-" = Information not applicable or not available.  
ND = not detected

**Attachment 1**  
**Analytical Report**



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
TestAmerica Cedar Falls  
704 Enterprise Drive  
Cedar Falls, IA 50613  
Tel: (319)277-2401

TestAmerica Job ID: 310-145859-1  
Client Project/Site: UPRR Sedalia, MO - Former MP Shops

For:  
GHD Services Inc.  
3807 S. 148th Street  
Omaha, Nebraska 68144

Attn: Robyn Hansen



Authorized for release by:  
12/18/2018 2:34:29 PM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
shawn.hayes@testamericainc.com

### LINKS

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The  
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[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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## Case Narrative

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Job ID: 310-145859-1**

**Laboratory: TestAmerica Cedar Falls**

### Narrative

**Job Narrative**  
**310-145859-1**

### Comments

No additional comments.

### Receipt

The samples were received on 12/12/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.8° C.

### GC/MS VOA

Method(s) 8260C: The laboratory control sample (LCS) for analytical batch 310-225169 recovered outside control limits for the following analyte: 4-Methyl-2-pentanone (MIBK). The analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

Method(s) 8260C: The continuing calibration verification (CCV) analyzed in batch 310-225266 was outside the method criteria for the following analyte: 1,2,4-Trichlorobenzene (-21.1 %D). A LCS standard was analyzed with the affected samples and found to be acceptable using CCV criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



## Sample Summary

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-145859-1	WG-2365-RS1-181211	Water	12/11/18 08:30	12/12/18 10:15
310-145859-2	Trip Blank	Water	12/11/18 08:30	12/12/18 10:15

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## Detection Summary

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: WG-2365-RS1-181211**

**Lab Sample ID: 310-145859-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	14.2		1.00		ug/L	1		8260C	Total/NA
trans-1,2-Dichloroethene	2.16		1.00		ug/L	1		8260C	Total/NA
Tetrachloroethene	22.3		1.00		ug/L	1		8260C	Total/NA
Trichloroethene	13.0		1.00		ug/L	1		8260C	Total/NA
Vinyl chloride	1.38		1.00		ug/L	1		8260C	Total/NA

**Client Sample ID: Trip Blank**

**Lab Sample ID: 310-145859-2**

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Cedar Falls

# Client Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: WG-2365-RS1-181211**

**Lab Sample ID: 310-145859-1**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

## Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			12/13/18 11:09	1
Benzene	<0.500		0.500		ug/L			12/13/18 11:09	1
Bromobenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Bromochloromethane	<5.00		5.00		ug/L			12/13/18 11:09	1
Bromodichloromethane	<1.00		1.00		ug/L			12/13/18 11:09	1
Bromoform	<5.00		5.00		ug/L			12/13/18 11:09	1
Bromomethane	<4.00		4.00		ug/L			12/13/18 11:09	1
2-Butanone (MEK)	<10.0		10.0		ug/L			12/13/18 11:09	1
n-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
sec-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
tert-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Carbon tetrachloride	<2.00		2.00		ug/L			12/13/18 11:09	1
Chlorobenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Chlorodibromomethane	<5.00		5.00		ug/L			12/13/18 11:09	1
Chloroethane	<4.00		4.00		ug/L			12/13/18 11:09	1
Chloroform	<3.00		3.00		ug/L			12/13/18 11:09	1
Chloromethane	<3.00		3.00		ug/L			12/13/18 11:09	1
2-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 11:09	1
4-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,2-Dibromo-3-Chloropropane	<5.00		5.00		ug/L			12/13/18 11:09	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			12/13/18 11:09	1
Dibromomethane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			12/13/18 11:09	1
1,1-Dichloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,2-Dichloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,1-Dichloroethene	<2.00		2.00		ug/L			12/13/18 11:09	1
<b>cis-1,2-Dichloroethene</b>	<b>14.2</b>		1.00		ug/L			12/13/18 11:09	1
<b>trans-1,2-Dichloroethene</b>	<b>2.16</b>		1.00		ug/L			12/13/18 11:09	1
1,2-Dichloropropane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,3-Dichloropropane	<1.00		1.00		ug/L			12/13/18 11:09	1
2,2-Dichloropropane	<4.00		4.00		ug/L			12/13/18 11:09	1
1,1-Dichloropropene	<1.00		1.00		ug/L			12/13/18 11:09	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 11:09	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 11:09	1
Ethylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Hexachlorobutadiene	<5.00		5.00		ug/L			12/13/18 11:09	1
Hexane	<1.00		1.00		ug/L			12/13/18 11:09	1
Isopropylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
p-Isopropyltoluene	<1.00		1.00		ug/L			12/13/18 11:09	1
4-Methyl-2-pentanone (MIBK)	<10.0 *		10.0		ug/L			12/13/18 11:09	1
Methylene Chloride	<5.00		5.00		ug/L			12/13/18 11:09	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			12/13/18 11:09	1
Naphthalene	<5.00		5.00		ug/L			12/14/18 10:51	1
N-Propylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
Styrene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1

TestAmerica Cedar Falls



# Client Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: WG-2365-RS1-181211**

**Lab Sample ID: 310-145859-1**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1
<b>Tetrachloroethene</b>	<b>22.3</b>		1.00		ug/L			12/13/18 11:09	1
Toluene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 11:09	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 11:09	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			12/13/18 11:09	1
<b>Trichloroethene</b>	<b>13.0</b>		1.00		ug/L			12/13/18 11:09	1
Trichlorofluoromethane	<4.00		4.00		ug/L			12/13/18 11:09	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			12/13/18 11:09	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 11:09	1
<b>Vinyl chloride</b>	<b>1.38</b>		1.00		ug/L			12/13/18 11:09	1
Xylenes, Total	<3.00		3.00		ug/L			12/13/18 11:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		80 - 120					12/13/18 11:09	1
4-Bromofluorobenzene (Surr)	99		80 - 120					12/14/18 10:51	1
Dibromofluoromethane (Surr)	105		80 - 120					12/13/18 11:09	1
Dibromofluoromethane (Surr)	107		80 - 120					12/14/18 10:51	1
Toluene-d8 (Surr)	98		80 - 120					12/13/18 11:09	1
Toluene-d8 (Surr)	99		80 - 120					12/14/18 10:51	1

TestAmerica Cedar Falls

# Client Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: Trip Blank**

**Lab Sample ID: 310-145859-2**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

## Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			12/13/18 11:31	1
Benzene	<0.500		0.500		ug/L			12/13/18 11:31	1
Bromobenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Bromochloromethane	<5.00		5.00		ug/L			12/13/18 11:31	1
Bromodichloromethane	<1.00		1.00		ug/L			12/13/18 11:31	1
Bromoform	<5.00		5.00		ug/L			12/13/18 11:31	1
Bromomethane	<4.00		4.00		ug/L			12/13/18 11:31	1
2-Butanone (MEK)	<10.0		10.0		ug/L			12/13/18 11:31	1
n-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
sec-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
tert-Butylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Carbon tetrachloride	<2.00		2.00		ug/L			12/13/18 11:31	1
Chlorobenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Chlorodibromomethane	<5.00		5.00		ug/L			12/13/18 11:31	1
Chloroethane	<4.00		4.00		ug/L			12/13/18 11:31	1
Chloroform	<3.00		3.00		ug/L			12/13/18 11:31	1
Chloromethane	<3.00		3.00		ug/L			12/13/18 11:31	1
2-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 11:31	1
4-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2-Dibromo-3-Chloropropane	<5.00		5.00		ug/L			12/13/18 11:31	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			12/13/18 11:31	1
Dibromomethane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			12/13/18 11:31	1
1,1-Dichloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2-Dichloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,1-Dichloroethene	<2.00		2.00		ug/L			12/13/18 11:31	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			12/13/18 11:31	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2-Dichloropropane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,3-Dichloropropane	<1.00		1.00		ug/L			12/13/18 11:31	1
2,2-Dichloropropane	<4.00		4.00		ug/L			12/13/18 11:31	1
1,1-Dichloropropene	<1.00		1.00		ug/L			12/13/18 11:31	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 11:31	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 11:31	1
Ethylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Hexachlorobutadiene	<5.00		5.00		ug/L			12/13/18 11:31	1
Hexane	<1.00		1.00		ug/L			12/13/18 11:31	1
Isopropylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
p-Isopropyltoluene	<1.00		1.00		ug/L			12/13/18 11:31	1
4-Methyl-2-pentanone (MIBK)	<10.0 *		10.0		ug/L			12/13/18 11:31	1
Methylene Chloride	<5.00		5.00		ug/L			12/13/18 11:31	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			12/13/18 11:31	1
Naphthalene	<5.00		5.00		ug/L			12/13/18 11:31	1
N-Propylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Styrene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1

TestAmerica Cedar Falls

# Client Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: Trip Blank**

**Lab Sample ID: 310-145859-2**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1
Tetrachloroethene	<1.00		1.00		ug/L			12/13/18 11:31	1
Toluene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 11:31	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 11:31	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			12/13/18 11:31	1
Trichloroethene	<1.00		1.00		ug/L			12/13/18 11:31	1
Trichlorofluoromethane	<4.00		4.00		ug/L			12/13/18 11:31	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			12/13/18 11:31	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 11:31	1
Vinyl chloride	<1.00		1.00		ug/L			12/13/18 11:31	1
Xylenes, Total	<3.00		3.00		ug/L			12/13/18 11:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		80 - 120					12/13/18 11:31	1
Dibromofluoromethane (Surr)	109		80 - 120					12/13/18 11:31	1
Toluene-d8 (Surr)	100		80 - 120					12/13/18 11:31	1



## Definitions/Glossary

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

### Qualifiers

#### GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
$\alpha$	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Surrogate Summary

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

### Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	BFB	DBFM	TOL
		(80-120)	(80-120)	(80-120)
310-145859-1	WG-2365-RS1-181211	99	105	98
310-145859-1	WG-2365-RS1-181211	99	107	99
310-145859-2	Trip Blank	100	109	100
LCS 310-225169/5	Lab Control Sample	103	102	101
LCS 310-225169/6	Lab Control Sample	99	103	98
LCS 310-225266/6	Lab Control Sample	102	103	99
MB 310-225169/7	Method Blank	99	108	102
MB 310-225266/8	Method Blank	99	108	99

#### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

# QC Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

## Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 310-225169/7  
Matrix: Water  
Analysis Batch: 225169

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			12/13/18 04:34	1
Benzene	<0.500		0.500		ug/L			12/13/18 04:34	1
Bromobenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Bromochloromethane	<5.00		5.00		ug/L			12/13/18 04:34	1
Bromodichloromethane	<1.00		1.00		ug/L			12/13/18 04:34	1
Bromoform	<5.00		5.00		ug/L			12/13/18 04:34	1
Bromomethane	<4.00		4.00		ug/L			12/13/18 04:34	1
2-Butanone (MEK)	<10.0		10.0		ug/L			12/13/18 04:34	1
n-Butylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
sec-Butylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
tert-Butylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Carbon tetrachloride	<2.00		2.00		ug/L			12/13/18 04:34	1
Chlorobenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Chlorodibromomethane	<5.00		5.00		ug/L			12/13/18 04:34	1
Chloroethane	<4.00		4.00		ug/L			12/13/18 04:34	1
Chloroform	<3.00		3.00		ug/L			12/13/18 04:34	1
Chloromethane	<3.00		3.00		ug/L			12/13/18 04:34	1
2-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 04:34	1
4-Chlorotoluene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2-Dibromo-3-Chloropropane	<5.00		5.00		ug/L			12/13/18 04:34	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			12/13/18 04:34	1
Dibromomethane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			12/13/18 04:34	1
1,1-Dichloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2-Dichloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,1-Dichloroethene	<2.00		2.00		ug/L			12/13/18 04:34	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			12/13/18 04:34	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2-Dichloropropane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,3-Dichloropropane	<1.00		1.00		ug/L			12/13/18 04:34	1
2,2-Dichloropropane	<4.00		4.00		ug/L			12/13/18 04:34	1
1,1-Dichloropropene	<1.00		1.00		ug/L			12/13/18 04:34	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 04:34	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			12/13/18 04:34	1
Ethylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Hexachlorobutadiene	<5.00		5.00		ug/L			12/13/18 04:34	1
Hexane	<1.00		1.00		ug/L			12/13/18 04:34	1
Isopropylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
p-Isopropyltoluene	<1.00		1.00		ug/L			12/13/18 04:34	1
4-Methyl-2-pentanone (MIBK)	<10.0		10.0		ug/L			12/13/18 04:34	1
Methylene Chloride	<5.00		5.00		ug/L			12/13/18 04:34	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			12/13/18 04:34	1
Naphthalene	<5.00		5.00		ug/L			12/13/18 04:34	1
N-Propylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Styrene	<1.00		1.00		ug/L			12/13/18 04:34	1

TestAmerica Cedar Falls



# QC Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-225169/7

Matrix: Water

Analysis Batch: 225169

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
Tetrachloroethene	<1.00		1.00		ug/L			12/13/18 04:34	1
Toluene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 04:34	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			12/13/18 04:34	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			12/13/18 04:34	1
Trichloroethene	<1.00		1.00		ug/L			12/13/18 04:34	1
Trichlorofluoromethane	<4.00		4.00		ug/L			12/13/18 04:34	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			12/13/18 04:34	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			12/13/18 04:34	1
Vinyl chloride	<1.00		1.00		ug/L			12/13/18 04:34	1
Xylenes, Total	<3.00		3.00		ug/L			12/13/18 04:34	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		80 - 120		12/13/18 04:34	1
Dibromofluoromethane (Surr)	108		80 - 120		12/13/18 04:34	1
Toluene-d8 (Surr)	102		80 - 120		12/13/18 04:34	1

Lab Sample ID: LCS 310-225169/5

Matrix: Water

Analysis Batch: 225169

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	40.0	51.91		ug/L		130	50 - 150
Benzene	20.0	20.90		ug/L		105	77 - 120
Bromobenzene	20.0	20.21		ug/L		101	70 - 120
Bromochloromethane	20.0	22.02		ug/L		110	73 - 132
Bromodichloromethane	20.0	19.66		ug/L		98	73 - 120
Bromoform	20.0	19.10		ug/L		95	57 - 120
2-Butanone (MEK)	40.0	47.38		ug/L		118	50 - 150
n-Butylbenzene	20.0	19.62		ug/L		98	63 - 120
sec-Butylbenzene	20.0	19.52		ug/L		98	64 - 120
tert-Butylbenzene	20.0	20.06		ug/L		100	64 - 120
Carbon tetrachloride	20.0	20.72		ug/L		104	72 - 126
Chlorobenzene	20.0	20.57		ug/L		103	74 - 120
Chlorodibromomethane	20.0	20.48		ug/L		102	66 - 120
Chloroform	20.0	21.54		ug/L		108	78 - 121
2-Chlorotoluene	20.0	20.14		ug/L		101	71 - 120
4-Chlorotoluene	20.0	19.93		ug/L		100	71 - 120
1,2-Dibromo-3-Chloropropane	20.0	19.72		ug/L		99	50 - 150
1,2-Dibromoethane (EDB)	20.0	22.11		ug/L		111	71 - 125
Dibromomethane	20.0	22.06		ug/L		110	76 - 125
1,2-Dichlorobenzene	20.0	18.87		ug/L		94	66 - 120
1,3-Dichlorobenzene	20.0	19.63		ug/L		98	67 - 120
1,4-Dichlorobenzene	20.0	19.25		ug/L		96	68 - 120

TestAmerica Cedar Falls



# QC Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-225169/5

Matrix: Water

Analysis Batch: 225169

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethane	20.0	21.21		ug/L		106	75 - 125
1,2-Dichloroethane	20.0	22.45		ug/L		112	75 - 123
1,1-Dichloroethene	20.0	22.48		ug/L		112	75 - 124
cis-1,2-Dichloroethene	20.0	20.79		ug/L		104	77 - 120
trans-1,2-Dichloroethene	20.0	20.46		ug/L		102	75 - 122
1,2-Dichloropropane	20.0	21.31		ug/L		107	75 - 123
1,3-Dichloropropane	20.0	22.38		ug/L		112	75 - 123
2,2-Dichloropropane	20.0	16.13		ug/L		81	50 - 150
1,1-Dichloropropene	20.0	22.24		ug/L		111	77 - 124
cis-1,3-Dichloropropene	20.0	20.34		ug/L		102	70 - 120
trans-1,3-Dichloropropene	20.0	19.84		ug/L		99	69 - 120
Ethylbenzene	20.0	20.45		ug/L		102	73 - 120
Hexachlorobutadiene	20.0	17.87		ug/L		89	50 - 150
Hexane	20.0	16.01		ug/L		80	50 - 150
Isopropylbenzene	20.0	20.65		ug/L		103	69 - 120
p-Isopropyltoluene	20.0	19.88		ug/L		99	68 - 120
4-Methyl-2-pentanone (MIBK)	40.0	52.59 *		ug/L		131	59 - 126
Methylene Chloride	20.0	22.35		ug/L		112	50 - 150
Methyl tert-butyl ether	20.0	23.09		ug/L		115	72 - 121
Naphthalene	20.0	17.14		ug/L		86	50 - 150
N-Propylbenzene	20.0	20.27		ug/L		101	70 - 120
Styrene	20.0	20.71		ug/L		104	70 - 120
1,1,1,2-Tetrachloroethane	20.0	21.51		ug/L		108	72 - 120
1,1,1,2,2-Tetrachloroethane	20.0	22.03		ug/L		110	63 - 122
Tetrachloroethene	20.0	20.42		ug/L		102	72 - 129
Toluene	20.0	20.69		ug/L		103	74 - 120
1,2,3-Trichlorobenzene	20.0	17.19		ug/L		86	50 - 150
1,2,4-Trichlorobenzene	20.0	17.22		ug/L		86	59 - 120
1,1,1-Trichloroethane	20.0	21.28		ug/L		106	76 - 127
1,1,2-Trichloroethane	20.0	21.60		ug/L		108	69 - 127
Trichloroethene	20.0	21.20		ug/L		106	77 - 123
1,2,3-Trichloropropane	20.0	22.04		ug/L		110	66 - 120
1,2,4-Trimethylbenzene	20.0	19.64		ug/L		98	67 - 120
1,3,5-Trimethylbenzene	20.0	20.08		ug/L		100	68 - 120
Xylenes, Total	40.0	41.68		ug/L		104	69 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		80 - 120
Dibromofluoromethane (Surr)	102		80 - 120
Toluene-d8 (Surr)	101		80 - 120

Lab Sample ID: LCS 310-225169/6

Matrix: Water

Analysis Batch: 225169

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromomethane	20.0	14.41		ug/L		72	38 - 150
Chloroethane	20.0	18.98		ug/L		95	69 - 129

TestAmerica Cedar Falls

# QC Sample Results

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-225169/6

Matrix: Water

Analysis Batch: 225169

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloromethane	20.0	15.28		ug/L		76	50 - 150
Dichlorodifluoromethane	20.0	18.69		ug/L		93	50 - 150
Trichlorofluoromethane	20.0	20.63		ug/L		103	68 - 146
Vinyl chloride	20.0	19.10		ug/L		96	67 - 133

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	99		80 - 120
Dibromofluoromethane (Surr)	103		80 - 120
Toluene-d8 (Surr)	98		80 - 120

Lab Sample ID: MB 310-225266/8

Matrix: Water

Analysis Batch: 225266

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<5.00		5.00		ug/L			12/14/18 08:39	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		80 - 120		12/14/18 08:39	1
Dibromofluoromethane (Surr)	108		80 - 120		12/14/18 08:39	1
Toluene-d8 (Surr)	99		80 - 120		12/14/18 08:39	1

Lab Sample ID: LCS 310-225266/6

Matrix: Water

Analysis Batch: 225266

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	20.0	15.43		ug/L		77	50 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		80 - 120
Dibromofluoromethane (Surr)	103		80 - 120
Toluene-d8 (Surr)	99		80 - 120

TestAmerica Cedar Falls

## QC Association Summary

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

### GC/MS VOA

#### Analysis Batch: 225169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-145859-1	WG-2365-RS1-181211	Total/NA	Water	8260C	
310-145859-2	Trip Blank	Total/NA	Water	8260C	
MB 310-225169/7	Method Blank	Total/NA	Water	8260C	
LCS 310-225169/5	Lab Control Sample	Total/NA	Water	8260C	
LCS 310-225169/6	Lab Control Sample	Total/NA	Water	8260C	

#### Analysis Batch: 225266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-145859-1	WG-2365-RS1-181211	Total/NA	Water	8260C	
MB 310-225266/8	Method Blank	Total/NA	Water	8260C	
LCS 310-225266/6	Lab Control Sample	Total/NA	Water	8260C	

## Lab Chronicle

Client: GHD Services Inc.  
Project/Site: UPRR Sedalia, MO - Former MP Shops

TestAmerica Job ID: 310-145859-1

**Client Sample ID: WG-2365-RS1-181211**

**Lab Sample ID: 310-145859-1**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	225169	12/13/18 11:09	SJN	TAL CF
Total/NA	Analysis	8260C		1	225266	12/14/18 10:51	SJN	TAL CF

**Client Sample ID: Trip Blank**

**Lab Sample ID: 310-145859-2**

**Date Collected: 12/11/18 08:30**

**Matrix: Water**

**Date Received: 12/12/18 10:15**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	225169	12/13/18 11:31	SJN	TAL CF

### Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401



## Accreditation/Certification Summary

Client: GHD Services Inc.

TestAmerica Job ID: 310-145859-1

Project/Site: UPRR Sedalia, MO - Former MP Shops

### Laboratory: TestAmerica Cedar Falls

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
AIHA-LAP, LLC	IHLAP		101044	11-01-20
Georgia	State Program	4	IA100001 (OR)	09-29-19
Illinois	NELAP	5	200024	11-29-19
Iowa	State Program	7	007	12-01-19
Kansas	NELAP	7	E-10341	01-31-19
Minnesota	NELAP	5	019-999-319	12-31-18
Minnesota (Petrofund)	State Program	1	3349	08-22-19
North Dakota	State Program	8	R-186	09-29-19
Oregon	NELAP	10	IA100001	09-29-19

TestAmerica Cedar Falls

## Method Summary

Client: GHD Services Inc.

TestAmerica Job ID: 310-145859-1

Project/Site: UPRR Sedalia, MO - Former MP Shops

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL CF
5030B	Purge and Trap	SW846	TAL CF

### Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

### Laboratory References:

TAL CF = TestAmerica Cedar Falls, 704 Enterprise Drive, Cedar Falls, IA 50613, TEL (319)277-2401



## Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: <u>GHD Services</u>			
City/State: <u>Omaha</u> <u>NE</u>		Project: <u>UPRR Sedalia, MO, former MP Shops</u>	
<b>Receipt Information</b>			
Date/Time Received: <u>11/21/18</u> <u>1015</u>		Received By: <u>AB</u>	
Delivery Type: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> TA Courier <input type="checkbox"/> TA Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?		If yes: Cooler ID:	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Multiple Coolers?		If yes: Cooler # ____ of ____	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Cooler Custody Seals Present?		If yes: Cooler custody seals intact?	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?		If yes: Sample custody seals intact?	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?		If yes: Which VOA samples are in cooler? ↓	
<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<u>AB 11/21/18</u>			
<b>Temperature Record</b>			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>N</u>		Correction Factor (°C): <u>0.6</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>5.8</u>		Corrected Temp (°C): <u>5.8</u>	
• Sample Container Temperature			
Container type(s) used:			
Uncorrected Temp (°C):		Corrected Temp (°C):	
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			



704 Enterprise Drive  
Cedar Falls, IA 50613  
Phone (319) 277-2401 Fax (319) 277-2425

TestAmerica

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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## Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-145859-1

Login Number: 145859

List Source: TestAmerica Cedar Falls

List Number: 1

Creator: Homolar, Dana J

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**Attachment 2**  
**Data Validation Report**




# Memorandum

December 21, 2018

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To: Robyn Hansen Ref. No.: 11183954-95-08-2365

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From:  Jeffrey Cloud/eew/109-NF Tel: 206-914-3141

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CC: Jesse Orth, Julie Lidstone

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**Subject: Analytical Results and Reduced Validation of Report J145859  
Semiannual Discharge Monitoring  
Union Pacific Railroad (UPRR) – Former MP Shops  
Sedalia, Missouri  
December 2018**

---

## 1. Introduction

This document details a reduced validation of analytical results for a water sample collected in support of the Semiannual Discharge Monitoring at the Former MP Shops site in Sedalia, Missouri during December 2018. The sample was submitted to TestAmerica Laboratories, Inc., located in Cedar Falls, Missouri. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2. The validated analytical results are summarized in Table 3.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical method referenced in Table 2 and applicable guidance from the document entitled "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008 subsequently referred to as the "Guidelines" in this Memorandum.

## 2. Sample Holding Time and Preservation

The sample holding time criterion and sample preservation requirements for the analysis are summarized in the method. The sample chain of custody document and analytical report were used to determine sample holding times. The sample was analyzed within the required holding time.

All sample containers were properly preserved, delivered on ice and stored by the laboratory at the required temperature (0-6°C).





### **3. Laboratory Method Blank Analyses**

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

### **4. Surrogate Spike Recoveries**

In accordance with the method employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for volatile organic compound (VOC) analysis were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against the control limits. All surrogate recoveries met the associated criteria.

### **5. Laboratory Control Sample Analyses**

Laboratory control samples (LCS) are prepared and analyzed as samples to assess the analytical efficiencies of the method employed, independent of sample matrix effects.

For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS contained all analytes of interest. All LCS recoveries were within associated control limits, demonstrating acceptable analytical accuracy with the exception of one high 4-methyl-2-pentanone (methyl isobutyl ketone) (MIBK) recovery. The associated sample result was non-detect and was not impacted. No qualification of the data was deemed necessary.

### **6. Field QA/QC Samples**

The field QA/QC consisted of one trip blank sample.

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for analysis. All results were non-detect for the analytes of interest.





## **7. Analyte Reporting**

The laboratory did not report any detected concentrations below the laboratory's reporting limit (RL). Non-detect results were presented as non-detect at the RL in Table 3.

## **8. Conclusion**

Based on the assessment detailed in the foregoing, the summarized data are acceptable without qualification.

Table 3

**Analytical Results Summary  
Semiannual Discharge Monitoring  
Union Pacific Railroad (UPRR) - Former MP Shops  
Sedalia, Missouri  
December 2018**

Location ID: RS-1 Trench Manhole  
Sample Name: WG-2365-RS1-181211  
Sample Date: 12/11/2018

Parameters	Unit	
<b>Volatile Organic Compounds</b>		
1,1,1,2-Tetrachloroethane	µg/L	<1.00
1,1,1-Trichloroethane	µg/L	<1.00
1,1,2,2-Tetrachloroethane	µg/L	<1.00
1,1,2-Trichloroethane	µg/L	<1.00
1,1-Dichloroethane	µg/L	<1.00
1,1-Dichloroethene	µg/L	<2.00
1,1-Dichloropropene	µg/L	<1.00
1,2,3-Trichlorobenzene	µg/L	<5.00
1,2,3-Trichloropropane	µg/L	<1.00
1,2,4-Trichlorobenzene	µg/L	<5.00
1,2,4-Trimethylbenzene	µg/L	<1.00
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	<5.00
1,2-Dibromoethane (Ethylene dibromide)	µg/L	<1.00
1,2-Dichlorobenzene	µg/L	<1.00
1,2-Dichloroethane	µg/L	<1.00
1,2-Dichloropropane	µg/L	<1.00
1,3,5-Trimethylbenzene	µg/L	<1.00
1,3-Dichlorobenzene	µg/L	<1.00
1,3-Dichloropropane	µg/L	<1.00
1,4-Dichlorobenzene	µg/L	<1.00
2,2-Dichloropropane	µg/L	<4.00
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	<10.0
2-Chlorotoluene	µg/L	<1.00
2-Phenylbutane (sec-Butylbenzene)	µg/L	<1.00
4-Chlorotoluene	µg/L	<1.00
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	<10.0
Acetone	µg/L	<10.0
Benzene	µg/L	<0.500
Bromobenzene	µg/L	<1.00
Bromodichloromethane	µg/L	<1.00
Bromoform	µg/L	<5.00
Bromomethane (Methyl bromide)	µg/L	<4.00
Carbon tetrachloride	µg/L	<2.00
Chlorobenzene	µg/L	<1.00

Table 3

**Analytical Results Summary  
Semiannual Discharge Monitoring  
Union Pacific Railroad (UPRR) - Former MP Shops  
Sedalia, Missouri  
December 2018**

Location ID: RS-1 Trench Manhole  
Sample Name: WG-2365-RS1-181211  
Sample Date: 12/11/2018

Parameters	Unit	
<b>Volatile Organic Compounds</b>		
Chlorobromomethane	µg/L	<5.00
Chloroethane	µg/L	<4.00
Chloroform (Trichloromethane)	µg/L	<3.00
Chloromethane (Methyl chloride)	µg/L	<3.00
cis-1,2-Dichloroethene	µg/L	14.2
cis-1,3-Dichloropropene	µg/L	<5.00
Cymene (p-Isopropyltoluene)	µg/L	<1.00
Dibromochloromethane	µg/L	<5.00
Dibromomethane	µg/L	<1.00
Dichlorodifluoromethane (CFC-12)	µg/L	<3.00
Ethylbenzene	µg/L	<1.00
Hexachlorobutadiene	µg/L	<5.00
Hexane	µg/L	<1.00
Isopropyl benzene	µg/L	<1.00
Methyl tert butyl ether (MTBE)	µg/L	<1.00
Methylene chloride	µg/L	<5.00
N-Butylbenzene	µg/L	<1.00
N-Propylbenzene	µg/L	<1.00
Naphthalene	µg/L	<5.00
Styrene	µg/L	<1.00
tert-Butylbenzene	µg/L	<1.00
Tetrachloroethene	µg/L	22.3
Toluene	µg/L	<1.00
trans-1,2-Dichloroethene	µg/L	2.16
trans-1,3-Dichloropropene	µg/L	<5.00
Trichloroethene	µg/L	13.0
Trichlorofluoromethane (CFC-11)	µg/L	<4.00
Vinyl chloride	µg/L	1.38
Xylenes (total)	µg/L	<3.00

**Notes:**

< - Not detected at the associated reporting limit